

## PT169070

Laser sensors  
Distance measuring sensors

- / Measuring range adjustable via teach-in
- / Analog output 4 ... 20mA
- / M8 plug connection

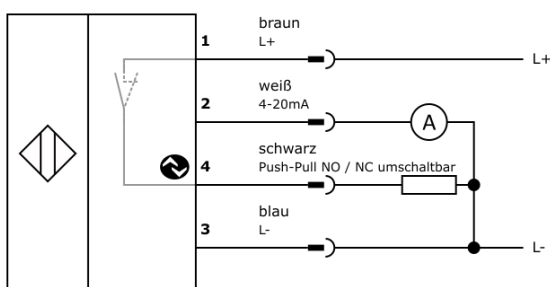


## IO-Link interface Laser protection class 1

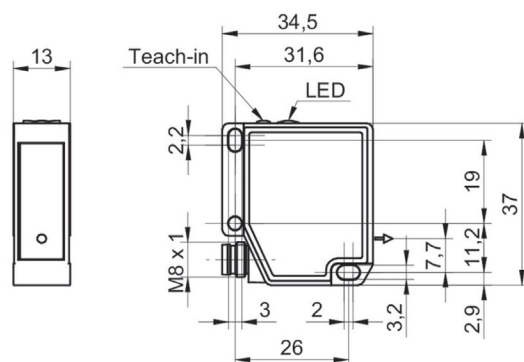
### TECHNICAL DATA

measuring range	16 ... 26mm
operating voltage $U_B$	12 ... 28V DC
analog output	4 ... 20mA
load resistance	< 750Ω
current consumption (without load)	100mA
switching output	Push-Pull
output current (max. load)	100mA
short-circuit protection	+
reverse polarity protection	+
measurement frequency	5.000Hz
switching frequency	20Hz
setting	Teach-in button / IO-Link
repeat accuracy	1μm
linearity deviation	± 0,08%
transmitting element	laser diode red, pulsed
wavelength	660nm
laser protection class	1
operating temperature	-10 ... +50°C
degree of protection (EN 60529)	IP 67
dimensions	13 x 37 x 34,5mm
connection	M8-connector 4-pin
connection accessories	e.g. VK205375

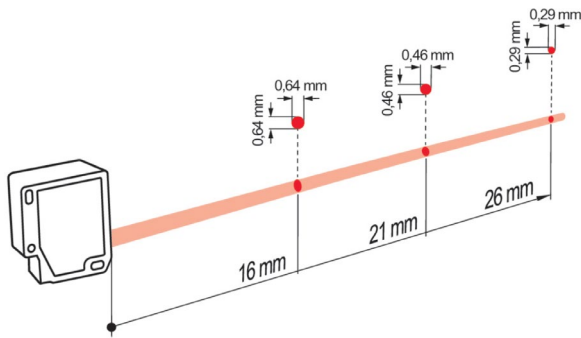
### Connection



### Dimensional drawing



**Laser beam course**



**Laser warning notice**



IEC 60825-1/2014  
 Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019

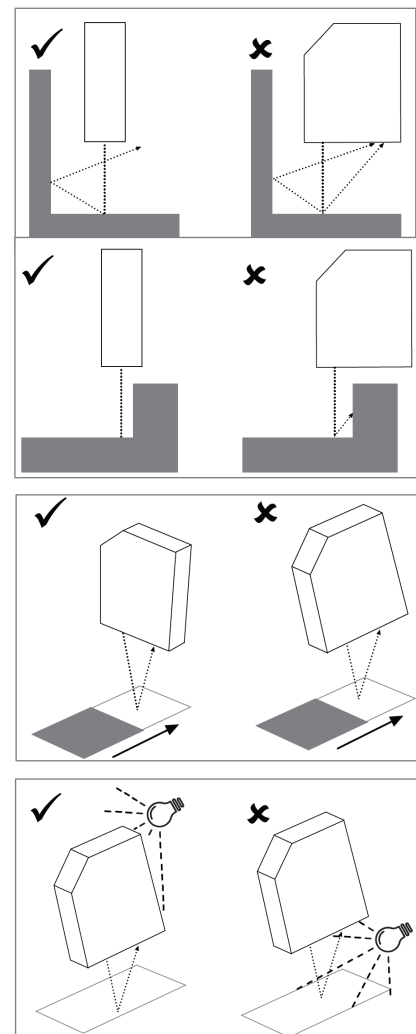
**Assembly instructions**

When mounting the sensor near a wall or a machine component: mount the sensor parallel to the wall to avoid disturbing reflections.

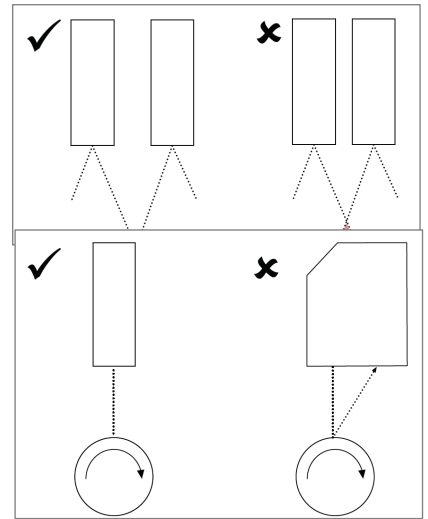
Measurement objects with height differences / measurements in holes or crevices:  
 Mount the sensor so that the receiving beam is not interrupted by the step

Mounting on targets with colored edges / with different reflectivity of the surface:  
 Align the sensor parallel to the color edge to avoid measurement errors.

Mounting near strong ambient light:  
 Avoid ambient light entering the detection range of the receiver.

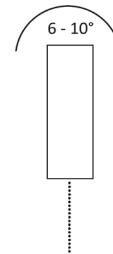


Mounting of several sensors close to each other:  
 Avoid overlapping the detection ranges of the receivers. Only your own laser spot may be within the detection range of the receiver.



Mounting for round measuring objects:  
 Align the sensor in one axis with the target to avoid interfering reflections.

For measuring objects with glossy surfaces:  
 Tilt the sensor 6 to 10° to the side so that the light reflected directly from the surface does not hit the sensor's receiver.



Pay attention to the maximum tightening torque of 0.6Nm when mounting!

## connection

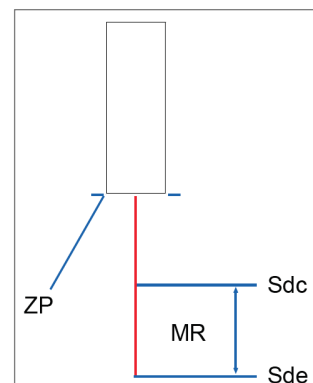
Disconnect the system from the power supply before connecting the device. Power supply according to UL 1310, Class 2 or external safeguarding by a UL recognized or listed fuse with max. 100W/Vp or max. 5A under 20V.

Note on electromagnetic compatibility: Shielded connection cable recommended. Ground the cable shield on both sides, over a large area, and ensure equipotential bonding.

## Measuring field

ZP: Zero pointSdc : Start of measuring range

MR: Measuring rangeSde : Measuring range end



## Sensor LED

description	Color	Lights up	Flashes
POWER	green	Sensor ready for operation	---
OUTPUT	yellow	No valid signal within the measuring range	Critical signal quality

In the factory settings, the OUTPUT (PIN4) and thus also the yellow LED follow the function of the alarm output. Alternatively, you can select the function of the switching output for the OUTPUT and the yellow LED using the IO-Link interface.

## Parameterize sensor

You can use the IO-Link parameters or the teach button on the sensor to set the sensor parameters.

The teach button is automatically deactivated 5 min after switching on or after the teach process, the time can be changed via IO-Link. If you keep the teach button pressed for longer than 12s, the sensor switches to operational mode without performing a parameterization.

In the following, the parameterization via the teach button is described.

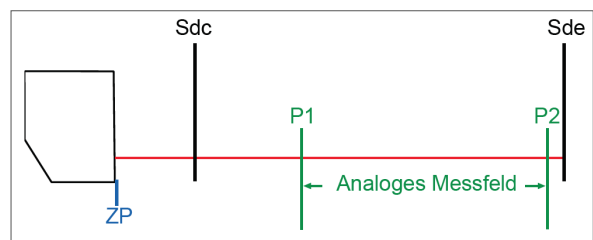
## Teach analog measuring field

Shifting the limits of the analog measurement field allows you to adjust the resolution of the analog output. By delimiting the analog measuring field, smaller distance changes can be displayed.

*Procedure:*

a) Briefly press the Teach button.

- Green and yellow LEDs light up (teach button is active). If the LEDs do not light up, the teach button is deactivated by the timeout. In this case, restart the sensor.



b) Press and hold the teach button for 4s.

- The yellow LED flashes at 2Hz.

c) Place the target on position 1 (P1) and press the teach button briefly within 60s.

- The min. limit of the analog measuring range is taught-in (distance at which 4mA is displayed).

d) Place the target on P2 and press the teach button briefly within 60s.

- The max. limit of the analog measuring range is taught-in (distance at which 20mA is displayed).

*Result:*

- Teach-in ok: Green and yellow LED light up briefly. The sensor then switches back to operational mode.
- Teach-in not ok: Green and yellow LEDs flash simultaneously at 8Hz.

## Teach zero point

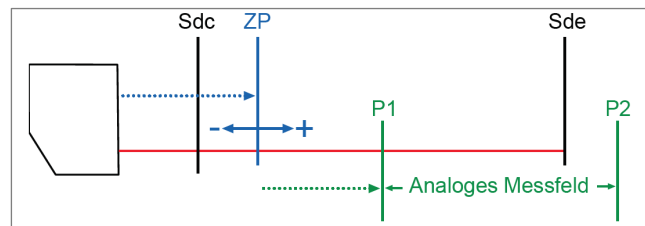
The zero point (ZP) is the reference point for the measurement (relative measurement). ZP is the basis for both the output measured values and the limits of the analog measuring field.

### Procedure:

- a) Briefly press the teach button.
  - Green and yellow LEDs light up (teach button is active). If the LEDs do not light up, the teach button is deactivated by the timeout. In this case, restart the sensor.
- b) Press and hold the teach button for 2s.
  - The green LED flashes at 2Hz.
- c) Place the target at the desired position for the zero point and briefly press the teach button within 60s.

### Result:

- Teach-in ok: Green and yellow LED light up briefly. The sensor then switches back to operational mode.
- Teach-in not ok: Green and yellow LEDs flash simultaneously at 8Hz.



### After shifting the zero point:

- the digital measured values before the zero point (in the direction of the sensor) are output as negative - and behind the zero point as positive measured values.
- the limits of the analog measuring field have shifted. Therefore, parameterize the analog measuring field again.

## Reset to factory settings

### Procedure:

- a) Briefly press the Teach button.
  - Green and yellow LEDs light up (teach button is active). If the LEDs do not light up, the teach button is deactivated by the timeout. In this case, restart the sensor.
- b) Press and hold the teach button for 8s.
  - Yellow and green LEDs flash simultaneously at 2Hz.

### Result:

- Teach-in ok: Green and yellow LED light up briefly. The sensor then returns to operational mode.
- Teach-in not ok: Yellow and green LEDs flash simultaneously at 8 Hz.

**IO-Link**

IO-Link distinguishes between two types of data: *Process data* and *parameters*.

**Process data**

Process data is cyclic data and is transferred in IO-Link communication mode with each query cycle. An explicit inquiry of the data is not necessary. The following process data is available for the sensor:

- Input:
  - Status of the switching output
  - Signal quality status
  - Alarm output status
  - Scale of the measured value
  - measured value
- Output:
  - Laser on/off

**Parameter**

Parameters are acyclic data (transmission takes place on demand). The following parameters are available for the sensor available:

- Filter for smoothing the signal curves
- Trigger for recording the measured value
- Processing invalid measured values
- Switching points
- Polarity (output level switching output)
- hysteresis
- Zero point
- Limits of the measuring range
- Limits of the analog measuring field
- Output & LED (alarm / switching output)
- Configuration teach button

A detailed description of the IO-Link functions can be found in the IODD description.

**factory settings**

description	IODD description	Value
Minimum limit of the analog measuring range	<i>Distance @AnalogMin</i>	Sdc
Maximum limit of the analog measuring range	<i>Distance @AnalogMax</i>	Sde
Zero point	<i>Zero Position</i>	0mm

**SAFETY INSTRUCTIONS:**

Before start-up, please make sure that all safety instructions in the product documentation, if applicable, have been observed!

In case of direct impact on personal safety, the application of these products is prohibited.